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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/345,238
Filing Date: June 30, 1999
Appellant(s): CHEN ET AL.

Kevin M. Mason
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 05/07/2008 appealing from the Office action mailed 12/18/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Chen et al. "Speaker, Environment and Channel Change Detection and Clustering via the Bayesian Information Criterion," proceedings of the DARPA broadcast news transcription and understanding workshop, Lansdowne, VA, Feb 8-11, 1998

5,930,748

KLEIDER et al.

7-1997

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. Claims 1-5, 8, 10-14, 16-19, 21-26 and 28-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al. ("speaker, Environment and Channel Change Detection and Clustering via the Bayesian Information Criterion," proceedings of the DARPA broadcast news transcription and understanding workshop, Lansdowne, VA, Feb 8-11, 1998) hereinafter referenced as Chen.

Regarding **claim 1**, Chen discloses 'Speaker, Environment and Channel Change Detection and Cluster via the Bayesian Information Criterion' (title), comprising segmenting 'the audio stream into homogeneous regions according to speaker identity, environmental condition and channel condition' and clustering 'speech segments into homogeneous clusters

according to speaker identity, environmental condition and channel' (page 1, paragraph 2), which is broadly read on the claimed "a method of tracking a speaker in an audio source, said method comprising the steps of: identifying potential segment boundaries in said audio source; and clustering homogeneous segments from said audio source substantially concurrently with said identifying step", in light of the specification (Fig 2, blocks/steps 220 and 230).

Regarding **claim 2** (depending on claim 1), Chen further discloses that decision for detecting changes (i.e. boundaries) in speaker identity based on the Bayesian Information Criterion (BIC) (page 2, paragraph 4), which is read on the claimed "wherein said identifying step identifies segment boundaries using a BIC model-selection criterion."

Regarding **claim 3** (depending on claim 2), Chen further assumes that the sequence of cepstral vectors is draw from an independent multivariate Gaussian process and there is at most one changing point in the Gaussian process (page 3, paragraphs 4-5), and discloses that the hypothesis testing is viewed as a problem of model selection by comparing two models: one models the data as two Gaussians; the other models the data as just one Gaussian (page 4, paragraph 2), which is read on the claimed "wherein a first model assumes there is no boundary in a portion of said audio source and a second model assumes there is a boundary in said portion of said audio source."

Regarding **claim 4** (depending on claim 2), Chen further discloses a combination of two equations: the maximum likelihood ratio (page 3, section 3.1 and equation (2)) and the difference between the BIC values of the two models (page 4, equation (3)), wherein equation (3), including function $R(i)$ (i.e. equation (2)) and function $P=1/2 (d+1/2 d (d+1)) \log N$ (see page 4, line 9), is mathematically (inherently) equivalent to the equation as claimed.

Regarding **claim 5** (depending on claim 1), Chen further discloses that an algorithm sequentially detects the changing points in the Gaussian process and suggests that the algorithm starts with a small window and then extends the window size in each detecting loop (page 6, paragraph 1). It is also inherently true that the smaller the window size is, the more unlikely the segment boundary occurs. This is read on the claimed “identifying step considers a smaller window size, n , of samples in areas where a segment boundary is unlikely to occur.”

Regarding **claim 8** (depending on claim 1), Chen further discloses not using the detected change point in new process window (see the algorithm: set $a = t + 1$) (page 6, paragraph 1), which is read on the claimed “BIC model selection test is not performed at the border of each window of samples.”

Regarding **claim 10** (depending on claim 1), Chen further discloses applying the BIC criterion for clustering (page 8, paragraph 2), which is read on the claimed “clustering step is performed using a BIC model-selection criterion.”

Regarding **claim 11** (depending on claim 10), Chen further discloses that in the hierarchical clustering two nodes can be merged only if the merging increases the BIC value (abstract, also see page 9, paragraph 3) that means the two models used in identifying step are also applied to clustering step, which is read on the claimed “wherein a first model assumes that two segments or clusters should be merged, and a second model assumes that said two segments or clusters should be maintained independently.”

Regarding **claim 12** (depending on claim 11), Chen further discloses that the two nodes should not be merged if equation (8) (page 9, paragraph 4) is negative, which is read on the

claimed “merging said two clusters if a difference in BIC values for each of said models is positive.”

Regarding **claim 13** (depending on claim 1), Chen further discloses to use M segments and k clusters (page 8, paragraphs 2 and 3) for successively merging two nearest nodes in clustering step and generating a new cluster set S from pervious set S (page 9, paragraph 3), which is read on the claimed “clustering step is performed using K previously identified clusters and M segments to be clustered.”

Regarding **claim 14** (depending on claim 1), Chen further disclose to assign s as an identifier for a new cluster from two previous nodes or clusters s1 and s2 after each merging (page 9, paragraph 3), which is read on the claimed “the step of assigning a cluster identifier to each of said clusters.” In addition, it is inherently true that an index of data structure employed for clustering task can be always used as a cluster identifier in software and/or firmware based process.

Regarding **claim 16**, the rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitations as claim 1. In addition, the appellant points out that “humongous segments” are “generally corresponding to the same speaker” (the specification: abstract).

Regarding **claims 17-19 and 22** (depending on claim 16), the rejection is based on the same reason described for claims 2-3, 5 and 13 respectively, because the claims recite the same or similar limitations as claims 2-3, 5 and 13 respectively.

Regarding **claim 21** (depending on claim 16), the rejection is based on the same reason described for claims 10 and 11, because the claim recites the same or similar limitations as claims 10 and 11.

Regarding **claim 23**, the rejection is based on the same reason described for claim 16, because it also reads on the limitation of claim 23, wherein 'input audio stream' (abstract) and 'the task of automatic transcription of broadcast news' (page 1, paragraph 2) disclosed by Chen additionally support the rejection regarding claimed "during a pass through said audio source".

Regarding **claims 24-26 and 29** (depending on claim 23), the rejection is based on the same reason described for claims 2-3, 5 and 13 respectively, because the claims recite the same or similar limitations as claims 2-3, 5 and 13 respectively.

Regarding **claim 28** (depending on claim 23), the rejection is based on the same reason described for claims 10 and 11, because the claim recites the same or similar limitations as claims 10 and 11.

Regarding **claim 30**, it recites a system. The rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitations as claim 1, wherein the mechanism used by Chen necessarily or inherently includes components such memory and processor for the processing.

Regarding **claim 31**, it recites an article of manufacture. The rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitations as claim 1, wherein the mechanism used by Chen necessarily or inherently includes component such computer readable medium (memory) for the processing.

Regarding **claim 32**, it recites a system. The rejection is based on the same reason described for claim 16, because the claim recites the same or similar limitations as claim 16, wherein the mechanism used by Chen necessarily or inherently includes components such memory and processor for the processing.

Regarding **claim 33**, it recites an article of manufacture. The rejection is based on the same reason described for claim 16, because the claim recites the same or similar limitations as claim 16, wherein the mechanism used by Chen necessarily or inherently includes component such computer readable medium (memory) for the processing.

Regarding **claim 34**, it recites a system. The rejection is based on the same reason described for claim 23, because the claim recites the same or similar limitations as claim 23, wherein the mechanism used by Chen necessarily or inherently includes components such memory and processor for the processing.

Regarding **claim 35**, it recites an article of manufacture. The rejection is based on the same reason described for claim 23, because the claim recites the same or similar limitations as claim 23, wherein the mechanism used by Chen necessarily or inherently includes component such computer readable medium (memory) for the processing.

Claim Rejections - 35 USC § 103

2. Claims 6-7, 9, 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of well known prior art (MPEP 2144.03).

Regarding **claim 6** (depending on claim 5), Chen further discloses that by expanding the window, the final decision of a change point is made based on as much data points as possible

(page 6, paragraph 2), but Chen does not expressly disclose to increase small window size in slow manner and increase larger window size in a faster manner. However, the examiner takes official notice of the fact that it was well known in the art to adjust increase rate based on data size processed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chen by providing an adjustable increase rate base on processed window size, for purpose of reducing processing time.

Regarding **claim 7** (depending on claim 5), Chen further discloses that the window size $[a=t+1, b=a+1]=1$ is reinitialized after detecting a segment boundary (page 6, paragraph 1), which is read on the claimed “window size, n , is initialized to a minimum value after a segment boundary is detected.”

Regarding **claim 9** (depending on claim 2), Chen does not expressly disclose “BIC model selection test is not performed when the window size, n , exceeds a predefined threshold.” However, the examiner takes official notice of the fact that it was well known in the art to stop a process when it exceeds a predefined threshold.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chen by providing a predefined threshold and a test condition for the purpose of preventing a process from over sizing.

Regarding **claim 20** (depending on claim 17), Chen does not expressly disclose, “wherein said BIC model selection test is not performed where the detection of a boundary is unlikely to occur.” However, the examiner takes official notice of the fact that it was well known in the art to skip certain portion of data for processing, because the portion has very small chance to be hit.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chen by specifically providing a skipping mechanism for those data that unlikely have a boundary for detection, for purpose of increasing efficiency and reducing processing time.

Regarding **claim 27** (depending on claim 24), the rejection is based on the same reason described for claim 20, because the claim recites the same or similar limitations as claim 20.

3. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Kleider et al. (USPN 5,930,748), hereinafter referenced as Kleider.

Regarding **claim 15** (depending on claim 24), Chen fails to specifically disclose “processing said audio source with a speaker identification engine to assign a speaker name to each of said cluster.” However, the examiner contends that the concept of providing an identified speaker cluster with a speaker name was well known, as taught by Kleider.

In the same field of endeavor, Kleider discloses a speaker identification system and method. Kleider employs a speaker identification metric (226) (Fig. 2) in that each element is associated with one particular speaker in the speaker model data 213 (Fig. 2) (column 6, lines 25-32). Kleider further suggests that the information of the speaker model data may include speaker name (column 6, line 44).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chen by providing a speaker identification mechanism to associate a speaker cluster identifier with a speaker name, as taught by Kleider, for the purpose of using a common identifier in a speaker identification system.

(10) Response to Argument

Appellant's arguments (appeal brief: pages 5-10) mainly regard independent claims 1, 16, 23 and 30-35. It is noted that the key issue is whether the teachings of the prior art (Chen) can be properly read on the claimed limitations, based on the broadest reasonable interpretation of the claims, in light of the specification.

It is noted that apart from the response to the previous argued issue(s) (see the brief filed on 05/07/2008 hereinafter referenced as Brief: page 4, last paragraph to page 8, paragraph 2), the appellant argued that "the Examiner is including the case where the *clustering and segmenting are performed sequentially* (emphasized by appellant)", "this is contrary to the claim requirement that the clustering and segmenting are performed *"substantially concurrently"*", and "thus, the examiner's interpretation of the cited claims is not a reasonable interpretation". The appellant further explained examples (Brief: page 8, paragraph 5 to page 10, paragraph 1), which includes "loop" illustration of the specification and some teachings from Chen's disclosure, for supporting the applicant's arguments. The examiner respectfully disagrees with the appellant's arguments and has a different view of the prior art teachings and the claim interpretations.

Let us take example of claim 1 (similar to claims 16, 23 and 30-35), which recites "a method of tracking a speaker in an audio source, said method comprising the steps of: identifying potential segment boundaries in said audio source; and clustering homogeneous segments from said audio source substantially concurrently with said identifying step." It can be seen that the claim includes only two steps: identifying potential segment boundaries (i.e. segmenting) and clustering homogeneous segments, which, in fact, reflect **sequentially**

performed segmenting and clustering steps in the specification (see Fig 2, blocks/steps 220 and 230), and which made the argued/claimed limitation of “substantially concurrently” to be less clear meaning and lack of patentable weight. Further, it appears that the appellant’s arguments based on the claimed limitation of “substantially concurrently” try to exclude the examiner’s interpretation that the claim includes “clustering and segmenting are performed sequentially”, and at the same time the claim itself try to cover (include) the claimed two steps that, in fact, are performed sequentially in light of specification (as stated above). These arguments are either contrary themselves, or imply that the limitation of “substantially concurrently” does not exclude the examiner’s interpretation (stated above). Therefore, Chen’s teachings of segmenting ‘the audio stream into homogeneous regions according to speaker identity, environmental condition and channel condition’ and clustering ‘speech segments into homogeneous clusters according to speaker identity, environmental condition and channel’ (page 1, paragraph 2), is properly read on the claim, based on broadest reasonable interpretation of the claim, in light of the specification (Fig 2, blocks/steps 220 and 230), as state above.

In response to the appellant’s argument regarding the loop illustrated in Fig. 2 (Brief: page 8, paragraph 5), it is noted that the features upon which applicant relies (i.e., “the loop”) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, it is noted that since the limitation “substantially concurrently” is not specifically defined and linked to the loop in the specification, it has much broader scope, including the examiner’s interpretation as stated above, than the argued “loop” mechanism. Furthermore, it should be pointed out that the claim(s) only

recites two steps (segmenting and clustering) and Fig.2 shows the corresponding two steps (blocks 220 and 230) that performed sequentially, which provides further evidence to show that the rejection based on the examiner's interpretation in light of the specification is proper. Finally, it is noted that the appellant's argument "...segmentation may be performed both before and **after** clustering" is meaningless, because even in the local process (i.e. within a loop) segmenting always before clustering and no evidence in the application/arguments shows any useful application to perform segmentation after clustering.

Regarding the other part of the appellant's arguments (Brief: page 8, paragraph 6 to page 10, paragraph 1), it is noted that the arguments mainly explain what the extra features of prior art is doing, but not focus on how the rejection based on the prior art teachings fail to read on the claim(s). Therefore, the arguments fail to provide persuasive evidence to overcome the examiner's rejection based on the prior art teachings and claim interpretations (as stated above). Further, some argued features, such as "real-time video or audio stream", "real-time application", "simultaneous segmentation and clustering", are not recited in the rejected claim(s), so as being irrelevant to the claim rejection.

Regarding the appellant's arguments for claim rejection based on combined references (Brief: page 10, paragraphs 2-4), the response to the arguments is based on the same reason described for claim 1 (see above), because the arguments are based on the same issue(s) as claim 1. In fact, the appellant does not bring this part of rejection on appeal (see Brief: page 4, paragraph 4).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Qi Han
July 12, 2008
/Qi Han/
Examiner, Art Unit 2626

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